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TITLE: HEAT TREATMENT AND APPARATUS THEREFOR

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ABSTRACT:

PURPOSE: To obtain a crystal thin film over a widened area and with excellent reproducibility, by a method wherein an object of treatment is heat-treated using an energy beam shaped by a split semicylindrical lens and a semicylindrical lens disposed so that their longitudinal axes directions cross perpendicularly to each other.

CONSTITUTION: At a focal plane fb, a laser beam having Gaussian distribution is split at the center, and the split portions overlap with each other, whereby a linear laser beam B<SB>04</SB> shown at D is obtained which has a substantially uniform energy density distribution. At a focal plane fa,

two linear laser
beams B<SB>06</SB> are obtained which have a Gaussian
energy density
distribution. Between the focal planes f_a and f_b , a laser
beam B<SB>05</SB> is
obtained which has such a beam spot configuration that two
cut elliptical beams
face each other, that is, a double-humped energy density
distribution.
Employment of the linear laser beam B<SB>04</SB> having a
uniform energy
density distribution enables crystallization to be obtained
over a widened area
and with excellent reproducibility. When the laser beam
having a double-humped
energy density distribution is applied to a polycrystalline
silicon film so as
to be recrystallized, it is also possible to obtain a
silicon crystal film with
excellent crystallizability.

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